

In the claims:

1-13. (Cancelled)

14. (Currently Amended) A fluorescent ~~homogenous~~ nanoparticle comprising a fluorescent organic dye covalently conjugated to an organo-silane compound, wherein the fluorescent ~~homogenous~~ nanoparticle has a diameter from about 4 nm to about 150 nm ~~200 nm~~.

15. (Cancelled)

16. (Currently Amended) The fluorescent ~~homogenous~~ nanoparticle of claim 14 wherein the fluorescent ~~homogenous~~ nanoparticle has a diameter from about 4 nm to about 10 ~~50~~ nm.

17. (Currently Amended) The fluorescent ~~homogenous~~ nanoparticle of claim 14, further comprising a ligand positioned on an external surface of the fluorescent nanoparticle. ~~wherein the fluorescent homogenous nanoparticle has a diameter from about 4 nm to about 30 nm.~~

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (New) The fluorescent nanoparticle of claim 14, further comprising a mercapto group.

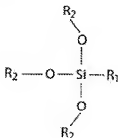
23. (New) The fluorescent nanoparticle of claim 14, further comprising a silica shell surrounding at least a portion of the external surface of the fluorescent nanoparticle.

24. (New) The fluorescent nanoparticle of claim 23, wherein a ratio of a diameter of an inner portion of the fluorescent nanoparticle to a diameter of the silica shell is between about 1:1 and 1:10.

25. (New) The fluorescent nanoparticle of claim 14, wherein the fluorescent quantum yield of the fluorescent organic dye in the nanoparticle is at least 25% greater than the fluorescent quantum yield of the same fluorescent organic dye free in aqueous solution.

26. (New) A fluorescent nanoparticle comprising:
a silica-based core comprising a mercapto group;
a fluorescent compound positioned within the silica-based core; and
a silica shell surrounding at least a portion of the core, wherein the fluorescent nanoparticle comprises a diameter between about 10.0 nanometers and about 150.0 nanometers.

27. (New) The fluorescent nanoparticle of claim 26, wherein the silica-based core comprises one or more silane compounds with the formula:



wherein R_1 = a fluorescent compound and R_2 = silicon.

28. (New) The fluorescent nanoparticle of claim 26, wherein the diameter is between about 10.0 nanometers and 25.0 nanometers.

29. (New) The fluorescent nanoparticle of claim 26, wherein a diameter of the core is between about 10.0 nanometers and 25.0 nanometers and a diameter of the shell is between about 25.0 nanometers and about 150.0 nanometers.

30. (New) The fluorescent nanoparticle of claim 26, wherein the fluorescent quantum yield of the fluorescent organic dye in the nanoparticle is at least 25% greater than the fluorescent quantum yield of the same fluorescent organic dye free in aqueous solution.

31. (New) The fluorescent nanoparticle of claim 26, wherein the fluorescent compound is an organic fluorescent compound covalently conjugated to the core.

32. (New) The fluorescent nanoparticle of claim 26, further comprising a ligand positioned on an external surface of the nanoparticle.

33. (New) The fluorescent nanoparticle of claim 26, wherein the mercapto group is bonded to a maleimide.

34. (New) A fluorescent nanoparticle comprising:
a silica-based core comprising a diameter between about 10.0 nanometers and 200.0 nanometers;

a fluorescent compound positioned within the silica-based core; and
a silica shell surrounding at least a portion of the core, the silica shell comprising a diameter between about 25.0 nanometers and about 500.0 nanometers.

35. (New) The fluorescent nanoparticle of claim 34, wherein a diameter of the core is between about 10.0 nanometers and 25.0 nanometers and a diameter of the shell is between about 25.0 nanometers and about 100.0 nanometers.

36. (New) The fluorescent nanoparticle of claim 34, wherein the fluorescent compound is an organic fluorescent compound covalently conjugated to the core.

37. (New) The fluorescent nanoparticle of claim 34, further comprising a ligand positioned on an external surface of the nanoparticle.

38. (New) The fluorescent nanoparticle of claim 34, wherein the silica-based core further comprises a mercapto group.